

Earth Science

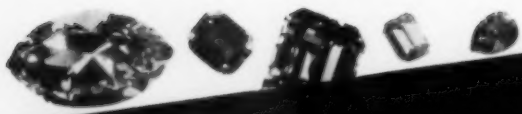
Rockhounds' NATIONAL Magazine



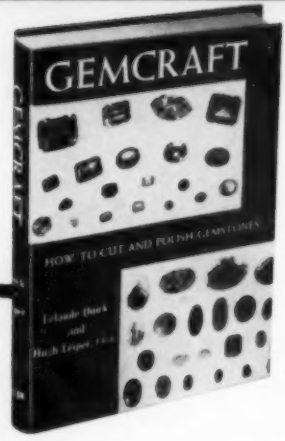
MINERALS and MINERS—Display of "Bob" Markert.

35¢

February Issue, 1960



GEMCRAFT



*the most modern
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book on how to cut and
polish gemstones*

Lelande Quick and Hugh Leiper, F.G.A.

*Here is all the concentrated information
from many years of experience in gem cutting
by two widely acknowledged experts.*

The writing of this work has been aided by their unexcelled opportunities for gathering advanced ideas on the best methods and techniques of thousands

of amateurs who are following America's third-largest and fastest growing craft hobby . . . gem cutting. The most modern machines and devices designed to aid the amateur in perfecting his skill are described and pictured, with scores of how-to-do-it photographs of step-by-step easily followed directions that graphically show the beginner how to start and complete the cutting of a gemstone; yet there is plenty for the expert too.

The authors, Lelande Quick, Publisher and Editor of *The Lapidary Journal* since it was founded in 1947, and Hugh Leiper, F.G.A., Associate Editor of the *Lapidary Journal* and formerly editor of the *Mineral Hobbyist*, brought to the writing of this new book the combined experience of two experts in the field who are actual gem cutters and faceters and are thus equipped to write from first-hand knowledge. In a unique manner, they have also had, over the years, contact with all that is best in the cutting, carving, grinding and polishing techniques developed by thousands of devotees of the lapidary craft.

242 pages (7 1/4" x 10 1/4"), 180 illustrations, \$7.50

The illustrations and diagrams—180 in number, are a feature of the book and show in detail how to carry on the various steps in each process, to prove that gem cutting can be done by anyone. Best examples of the finished work of scores of amateurs embellish the book.

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Earth Science

\$2 a YEAR

Vol. 13, No. 1

Official Publication of the Midwest Federation of Mineralogical Societies.

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STEWART'S GEM SHOP

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Boise, Idaho



Editor's Memo Pad

MUCH FOOD FOR THOUGHT: United States Senator, Hon. Thomas J. Dodd in a speech before the Senate, made recently upon the subject "Conservation of National Resources" says among other things:

Our national consumption of minerals is more than six times what it was in 1900, at the beginning of our "National Conservation Movement." The United States once a large exporter of raw materials has now become a large importer.

This presents a situation worthy of our serious consideration. As of today we are at least partially dependent upon foreign sources for every basic metal except magnesium and molybdenum.

The mineral resources of this planet are limited; but the appetite of man, while he endures upon this earth, is unlimited. Herein lies a great enigma, an apparent contradiction which casts a fearful shadow over prospects for continued human advance.

The succeeding stages of civilization, the ages of stone, bronze, and iron are delineated by, and named after, man's progressive mastery of the use of minerals. Logic dictates that at some point in time, unpredictable but no less certain, the falling curve of mineral deposits will intersect the rising curve of mineral consumption.

When that point arrives, unless man has evolved another material basis for his civilization, his brief hour of abundance and progress will signify just another temporary phenomenon, an interesting curiosity, and cheerless footnote in the endless geological history of our planet.

How close are we to that point of mineral exhaustion? Not until this century did men unlock the secrets of the earth sufficiently to challenge the adequacy of its resources. These are significant facts worthy of our careful study.

It was not until the era of Theodore Roosevelt that alarm over natural resource depletion resulted in a national conservation movement. And since the death of Theodore Roosevelt in 1919, more of the earth's mineral resources have been consumed than during the entire period of man's existence on earth prior to that time.

At mid-century, President Truman appointed a distinguished commission, headed by William S. Paley, to draw up a balance sheet of our total mineral assets contrasted with our foreseeable needs. On June 2, 1952, this Materials Policy Commission published one of the most significant government reports ever made.

The exhaustive survey of the Commission sought to answer this question: "Has the United States of America the material means to sustain its civilization?"

The answer, spelled out in five volumes, was conditional. If we embark upon a comprehensive program of conservation of present mineral resources and development of new sources of supply, we can sustain our civilization. If we do not, our days as a secure and prosperous people are numbered.

That was the message of the Paley Commission.

Seven years have passed since the publication of this definitive study. While significant accomplishments have been made in some areas, the comprehensive national program called for in the Paley report has not been devised or enacted. The diminution of our natural resources has proceeded at an accelerated pace. And so the time has come to restate this urgent problem, to renew the plea that long overdue remedial action be taken, and to suggest some lines of attack.

I have come to feel that in the long run there is probably no program more important to the future of this country and to the welfare of future generations than a dynamic "Program of Conservation."

Ed. Note: We regret that space does not permit the publication of the important points brought out in the balance of this masterful address, and would therefore advise anyone interested in this phase of conservation to write to the Senator's office in the U.S. Senate Office Building for a copy of his speech of "Conservation of Natural Resources," and also if inclined to consult the Paley Report (1952) for more of the statistical detailed information. B.H.W.

SUPPORT!!
Earth Science
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WHAT CAN WE DO FOR OUR JUNIORS

A large number of our local Rockhound Societies and Clubs are now beginning to recognize the importance of cultivating their junior members. Many of them are already doing splendid work in interesting and training their young folks, upon whom will later fall the task of carrying on the work of their parent Society.

In so doing they are not only supplementing the work which is being done in the science courses of our Secondary Schools, but in many cases they are also filling an important niche in our public educational systems which is now being almost wholly neglected in perhaps 90% of the schools.

AN OUTLINE FOR JUNIOR ACTIVITIES

The most valuable and comprehensive outline that we have yet seen for any phase of Earth Science club work, is the report of the Junior Activity Committee of the American Federation of Mineralogical Societies, prepared by Veryl Carnahan, and his associates, of Whittier, California (9531 Mina Avenue), presented at the Portland Convention. We can truthfully say that it has about "all the answers" and if you are sponsoring any form of Junior Activity, a copy of this report may be had for the asking.

GIVE YOUR JUNIORS SOMETHING TO DO—Another notable achievement, that has come to our attention, is the fine job being done by the Junior Section of the Marquette Geologists Society of Chicago. When the task of getting out their Club Bulletin seemed to be becoming a bit too burdensome for their busy elders, and was dragging almost to a halt, the Juniors took over the job, and surprisingly enough they take great pride in publishing one of the most outstanding bulletins of the Midwest Federation, with hand colored frontis page and all of the trimmings. It is a pleasure to see their fine artistic job—and perhaps your Juniors could do as well if the opportunity afforded. (Write Circulation Manager, Nan Priggie, 6919 31st Street, Berwyn, Illinois, for a sample copy.)

STUDY BOOKS ON THE JUNIOR LEVEL are now available. We can list only a few. Nothing we have yet seen is more attractive than the Golden Stamp Book of **ROCKS AND MINERALS**. This book contains 48 sizable colored pictures of typical minerals, printed on gummed paper, which are to be detached and pasted into the text at properly designated places. Simply written on the Junior High School level, the text itself is also nicely illus-

trated with pen sketches—and believe it or not, is priced at only 50c, and can be purchased on the five and dime store counters. Published by Simon and Schuster, Rockefeller Center, N.Y.

Of the other fine books for Juniors, we would suggest two recent ones, published as a public service by the Indiana State Geological Survey, Bloomington, Indiana. Both of these books, we might say, are almost in a class by themselves. They are delightfully illustrated with numerous appropriate pictures and drawings throughout. "Let's Look at Rocks," Circular No. 5, 1958; Price 35c. "Adventures with Fossils," Circular No. 6, 1959; Price 35c. And, incidentally for adult consumption, we recommend "Guide Book to Some Minerals and Rocks in Indiana," Circular No. 4, 1959, Price 25c.

1960 JUNIOR ESSAY CONTEST

Once again the **AMERICAN FEDERATION OF MINERALOGICAL SOCIETIES** is sponsoring a Junior Essay Contest.

The contest is open to any boy or girl, 16 years of age or under as of June 30, 1960.

All juniors are urged to enter essays and try to win one of the U.S. Savings Bonds or Cash Prizes. The complete Official Rules are given below.

1. Any boy or girl, 16 years of age or under as of June 30, 1960, is eligible to compete.
2. Each essay shall be entirely the work of the person entering the contest.
3. The subject of the Essay shall be: "Here's what I like about being a Rockhound."
4. The essay shall be between 500 and 700 words in length.
5. Prizes will be awarded at the 1960 Convention of the American Federation at Eureka, California, July 8 through July 10, 1960.
6. Contestants need not be present at the Convention to win. If winners are not in attendance, prizes will be mailed.
7. The prizes to be awarded will be as follows:
First Prize \$100.00 U.S. Bond, Series E
Second Prize 50.00 U.S. Bond, Series E
Third Prize 20.00 in cash
Fourth Prize 10.00 in cash
Fifth Prize 10.00 in cash
8. Deadline for mailing entries will be midnight, May 1st, 1960.
9. No entry blanks are required. Simply mail your entry to:

W. H. de Neui, Contest Chairman
6600 Cornelia Drive,
Minneapolis 24, Minn.

Now with this we believe you will have enough information to get busy and do something with and for our Junior members.—B.H.W.

FROM THE SUBLIME TO THE RIDICULOUS!!

John Ruskin wrote: "There are no natural objects out of which more can be learned than out of stones. They seem to have been created especially to reward the patient observer. For a stone, when it is examined, will be found to be a mountain in miniature. The surface of a stone is more interesting than the surface of an ordinary hill, more fantastic in form, and incomparably richer in color."

* * * *

"A LITTLE NONSENSE, NOW AND THEN
IS RELISHED BY THE BEST OF MEN."

PEOPLE who live in glass houses should never throw STONES even if they have them available per se.

Cooks	the Puddingstone
Farmers	Whetstone
Architects	Cornerstone
Laundress	Soapstone
Politicians	Blarneystone
Borrowers	Touchstone
Plasterers	Limestone
Policeman	Pavingstone
Freshman	Capstone
Masons	Sandstone
Burglars	Keystone
Bartenders	"Quartz"stone
Beauties	Peachstone
Editors	Grindstone
Astronomers	Moonstone
Arsonists	Firestone
Stockbrokers	Curbstone
Tourists	Yellowstone
Trumpeters	Hornstone
Soldiers	Bloodstone
Motorists	Milestone
Pedestrians	Tombstone
Convict	Stone pile

Thanks A.R.C. from St. Joseph, Missouri,
via The Triangle Tumbler.—E.S. Ed.

CONCRETE SAGACITY!!

CORUNDUM concrete: It's doubtful that King Midas himself built his palace on a foundation of rubies and sapphires. But Will Holbrook did; and his coffers weren't spilling over with gold. Here's how it happened:

Forty-five years ago, Will became caretaker for property belonging to the American Prospecting and Mining Co. in the Cowee valley of western North Carolina's mountains. For 20 years the company had extracted rubies from the valley's corundum gravel. Finally, labor costs increased to the point where the operation no longer paid off.

When Will took over, large quantities of corundum crystals, below gem grade, were stored in 10-gallon buckets in a warehouse on the property. Then the warehouse was destroyed by fire—but not the buckets.

About that time Will decided to build himself a frame house. Times were tough; and those buckets of crystals made an ideal mix for the cement for the foundation. . . .

Seems that rubies and sapphires are making a real firm foundation for the house of Holbrook—as long as Will's daughter, Ruth (the present occupant) can ward off the rock-hounds.

"If I turned my back, they'd chip the foundation right out from under me," she says.

But she doesn't chase 'em away. She just directs the amateur prospectors to two small diggings she's opened on the property. There, they can hunt treasure to their heart's content—for an adequate fee.

—Courtesy of the Jewelers' Circular-Keystone, November 1959.

OUR AUTHORS

Elmer E. Rexin, the discoverer/inventor of the "Well Water Seismometer," a unique scientific instrument for the recording and measuring of Earthquake Waves, is the husband of Bernice Rexin, most efficient Secretary of the Midwest Federation, also Club Editor of Earth Science Magazine. That "Elmer," who is the plant manager for the Nunn-Bush Shoe Company of Milwaukee, has made a definite and lasting contribution to science cannot be denied, and his name will long be associated with the science of Seismology, by his so doing.

* * * *

Wm. H. deNeui, who so nicely relates his ingenuity and "know-how" in devising means for etching polished surfaces, is Junior Essay Contest Chairman of the American Federation, and also very active and well known in Midwest circles. We are happy to publish this splendid article.

* * * *

Gus Brown, our "art lapidary" enthusiast, is widely known throughout Midwest circles, and a go-getter when it comes to boosting the welfare of the Federation and Earth Science magazine. Being the Chairman of the Promotion and Publicity Committee of the Midwest, much of its remarkable growth during the past few years can be attributed to his untiring efforts. His home base is Des Moines, Iowa, where he is active in the Des Moines Lapidary Society.

BOOK REVIEWS

PRINCIPLES OF MINERALOGY. William H. Dennen, Associate Professor of Geology, Massachusetts Institute of Technology. The Ronald Press Co., N.Y. 1959. 429 pp. \$7.50.

This book is designed to serve as a text for an introductory college course in mineralogy. Rather than follow the traditional approach of studying the properties, appearance, uses, occurrence, and techniques of identification of individual minerals, the author has chosen to present his subject as a study of the fundamental geometrical, chemical, and physical relationships of all matter.

Part I comprises chapters on symmetry, crystal chemistry, chemical and geometrical variations, physical characteristics, chemical testing, and general mineralogy including classification.

Part II considers minerals from the standpoint of chemical classification such as native elements, sulfides, sulfosalts, halides, oxides, hydroxides, carbonates, tungstates, molybdates, and silicates. Chemical formulas are found here, as well as crystallography, "confused with," etc.

Mineral and subject indices and a table of atomic parameters are included. Nearly 200 excellent line drawings show the molecular and crystalline structure of minerals.

PETROLEUM GEOLOGY. Second Edition. Kenneth K. Landes, Professor of Geology, University of Michigan. John Wiley & Sons, Inc. 1959. 443 pp. \$9.50.

Due to extensive new developments in the field of oil finding since 1951, when the first edition of this book was published, the author has found it necessary to rewrite up to seventy-five percent of the contents comprising the original publication.

The greater portion of the new edition deals with modern theories of the origin and evolution of oil and gas, rocks which contain oil and gas, associated fluids in the reservoirs, the migration of hydrocarbons through the rocks, and the various types of traps in which commercial deposits occur.

The new book may be generally divided into three parts. The first two chapters acquaint the reader with the background of professional petroleum geology, including oil and gas drilling and current production methods. Chapters three and four discuss techniques employed by the petroleum geologist. The remainder of the book is concerned with the geologic oc-

currence of petroleum. This final section is really the meat of the text and comprises some thirty trap case studies of U.S. and foreign oil fields, well illustrated with diagrams.

Even the non-technical reader will find this an extremely interesting and readable book.

OUR MINERAL RESOURCES. Charles M. Riley, Research Geologist, Humble Oil & Refining Company. John Wiley & Sons, Inc. 1959. 338 pp. \$6.95.

This book summarizes our knowledge to date about where and how our valuable mineral resources are formed by nature. It was written while the author was Assistant Professor of Geology at the University of Nebraska and was designed to supply a need for an elementary course in economic geology.

The book is divided into two sections. The first is concerned with the geologic occurrence of the more common metals, and the second with the geology of non-metallic resources. Some new deposits, described only in very recent publications, are discussed. An interesting feature of the book is a review of the history of ideas which scientists have proposed for the origin of mineral occurrences. This provides background for the present-day controversy about the formation of many primary lode deposits.

A knowledge of high school or college chemistry would be helpful to those interested in some of the scientific theories and facts presented, although a minimum amount of scientific terminology has been used. An extensive glossary, a list of current references and statistics, and numerous illustrations aid in making this a useful book to the beginning and intermediate students of geology and mineral economics.

DANA'S MANUAL OF MINERALOGY. 17th edition. Revised by Cornelius S. Hurlbut, Jr., Professor of Mineralogy, Harvard University. 609 pp. 1959. \$11.50.

Since most mineralogists have looked on Dana's Manual as their "Bible" since it was first published early in this century, a new edition is always noteworthy. The 17th follows the 16th edition by only seven years but new tools and new concepts have made this revision advisable in order to support the "living growth" that is mineralogy.

(Continued on page 32)

Midwest Club News

Mrs. Bernice Rexin, Club Editor

3934 N. Sherman Blvd.
Milwaukee 16, Wisconsin

THE MINERALORIST SOCIETY OF JOLIET, (Ill.), held their 30th Annual Christmas Party, in the faculty lounge of the Joliet High School and Junior College, on Thursday evening, December 10th. This venerable Society, claiming to be the oldest amateur "Rock-club" west of the Allegheny Mountains, is distinguished in many ways.

It is sponsored by the Geology Department of the Joliet Junior College, which was the first public J.C. in America, holding their monthly lecture meetings in Room No. 199, in which Earth Science was first taught as a Laboratory Science in the secondary schools of the country, with work-shop meetings in a modern departmental lapidary shop on stated evenings between.

Annual Field Trips to points of geologic and mineral interest in Northern Illinois were conducted by the Society for nearly twenty years, which were the progenitors of the present series of field trips now conducted by the Illinois State Geological Survey. It was on one of these trips in 1940, that the Midwest Federation was organized, the Society being one of the three Founding Societies.

Club lecturer, Frank L. Fleener, conducted what was perhaps the longest consecutive series of lectures on the Minerals of the Dana System, running for more than twelve years, ever given before any Society in America, and Drs. Fleener and Wilson, cooperating with Dr. H. C. Dake, authored "Quartz Family Minerals," now in its 15th edition, in 1938, which is the only complete book on the subject, and also probably the only book ever written upon a single mineral specie.

INDIANA GEOLOGY AND GEM CLUB recently heard a very engrossing talk on "Diamonds and Precious Stones," by John N. Goll, buyer of precious stones for the Baldwin-Miller Co. To rate as precious, Mr. Goll said, a stone must be durable—won't wear out or be easily marred so that it can be owned, enjoyed and handed down through generations. It must be relatively rare, so that one is willing to pay a considerable sum for it, and beautiful so that when properly fashioned it will have flash, fire and/or richness and depth of color. The diamond has all of these qualities; rarer still are the ruby, emerald, clear blue sapphire and alexandrite. Given stones of equal size, purity and workmanship, these four outrank diamond in value.

CHICAGO LAPIDARY CLUB held its tenth annual jeweled Christmas tree meeting on Dec. 3. The tree was decorated with ornaments fashioned by its members from cabochons, faceted gems and silver chains. Guest speaker Harry Witmer spoke on "Mazon Creek Fern Fossils," and displayed some outstanding specimens from his own superb collection of fern fossils. Mr. Witmer is a member of ESCONI Associates, publishers of George Langford's beautifully illustrated book "The Wilmington Coal Flora," which is the most authoritative work on the subject.

NEBRASKA MINERAL AND GEM CLUB plans to send the owner of each collecting area, that it visits, a gift made from material found in that vicinity. This should be a great help in keeping the good will of owners of properties on which good mineral and fossil specimens are found.

The club's second annual Lapalmin show held in September was a great success. The register of visitors revealed that guests came from 13 states, as far west as Washington, and as far east as New Jersey. Iowa topped the list with visitors from 42 of its towns. Lapalmin (la-pal-min) is a new word coined by George Balliette, President of NM&GC. It sums up the club's three interests: lapidary, paleontology, and mineralogy.

MIAMI VALLEY MINERAL AND GEM CLUB was given a demonstration of drilling with an automatic drill press at its September meeting. This machine, which is used for drilling into gemstones, such as spheres for beads, was designed and built by Roy Sinkhorn, a member of the society. It is a beautiful example of skilled craftsmanship and does a neat job of drilling.

HEART OF AMERICA GEOLOGY CLUB on Nov. 19 viewed slides of thin sections of rocks and minerals, shown and commented on by Dr. Eldon Parizek of the University of Kansas. Dr. Parizek, who is a sponsor of HOAGC, recently returned from Pittsburgh, Penn., where he presented a research paper on "Erosional Problems of Northwest Missouri and Northeast Kansas" at the annual meeting of the Geological Society of America.

MID-IOWA ROCK CLUB held its annual exhibit on Oct. 10-14. Nineteen cases were filled with specimens of fossils, minerals, crystals, lapidary work and Indian artifacts. The society is steadily increasing in membership and is already making plans for a larger show next year.

(Continued on page 13)

Midwest Federation
of
Mineralogical &
Geological Societies



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Harold Whiting Northern
R. E. Brush So. Western

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Gus Brown, Chairman Verne Montgomery, Co-Chairman

ATTENTION: ALL ROCK HOUNDS AND MINERALOGICAL SOCIETIES who have not as yet affiliated with the MIDWEST FEDERATION.

IN UNION THERE IS STRENGTH

Through affiliation with the Midwest comes the opportunity to participate in our Annual Conventions, Rockramas,* bulletin exchange programs, and receive information from our committees on each branch of the Earth Sciences.

It is not essential that one belong to a club in order to be eligible to join the Midwest Federation.

You will be very welcome and you will find the advantages to be gained far exceed the slight cost and effort expended.

The Midwest Federation comprises 88 clubs and numerous individuals, and is a branch of the larger American Federation which comprises numerous Federations throughout the U. S. and Canada.

For further details, contact Bernice Rexin, 3934 North Sherman Blvd., Milwaukee 16, Wisconsin.

EARTH SCIENCE, Official Magazine

P. O. BOX 1357, CHICAGO 90, ILLINOIS

*See Article "Rockrama's"—August '59 Issue Pg. 130.

20th Annual Midwest Federation Convention

A Letter from Bob Markert, President, Midwest Federation.

SO YOU are planning on coming to Ishpeming July 1st to 4th, for the 1960 Field Trip Convention of the Midwest Federation. That's just fine—we'll be looking for you, and let us tell you something of our planning. If you wish to make full use of all four days, we are arranging a check-in time for the evening before the convention starts, that is June 30th. Each of you will be assigned to a certain field trip chairman, who will act as captain, and believe me you will have to step lively to keep up with him for the next four busy days. Tired and almost exhausted by the "Fourth of July," you may be wishing that the field tripping would come to a halt, because you did not wish to miss out on a single thing, and your "get up and go" has "got up and went."

General Field Trip Chairman, Bernard Dooley, in a subsequent article in *Earth Science*, will outline what is in store for

you when you arrive here for four fun-packed days of collecting, swapping, visiting, singing and just having an old fashioned good time. Forms will soon be sent you via your club liaison officer, who will distribute them to all persons interested in attending this, the biggest Field Trip meet the good old Midwest Federation has ever known.

In order for you to become a part of this big event, on account of bus reservations, it will be necessary for you to send in your completed form to Mr. R. K. Richards, advance Reservation Chairman, telling him to what extent you will be participating. **THIS WILL BE VERY IMPORTANT, AS WE ARE EXPECTING FULLY 700 PEOPLE TO REGISTER FOR THIS EVENT.** Those who do not register in advance may find it impossible to join certain groups during the last few days immediately preceding the Convention. We have a lot of housing



Nothing can be finer than a full day in the field collecting good mineral specimens. This picture is typical of what is to take place at the Midwest Field Trip Convention at Ishpeming next July. Start making plans now to attend.

and restaurants in the area as well as tourist camps and parks, however, it must be remembered that this will be a National Holiday weekend and literally hundreds of other tourists, who are not Rockhounds, will also be seeking advanced reservations.

These forms which you will receive will request the following information: Advance Registration, which will include the cost of the outdoor barbeque, big bonfire and song fest of the night of Saturday, July 2nd. Note: Week ends always find eating places at a premium so it will be advisable for you to take advantage of this barbeque as well as the regular Convention Boulder Buster Banquet to be held on Sunday, July 3rd. The Form will provide places for your Banquet reservation, also reservations for the following bus field trips: The Copper Country; Iron Mountain-Iron River, and the Ironwood, Michigan area. Many new surprises are in store for those who elect



Semi-precious Jaspilite found at Jasper Knob, Ishpeming, Michigan. A fine collector's item.

to take these fine bus trips, as recently some very fine crystals have been uncovered in fair abundance, and you may be lucky enough to find some while on this trip. The Field Trip Committee will do everything within its power to keep these sources protected in order that the field trip participants will be the ones to be benefitted by the find. These bus trips will be one day round trips to each of the areas and reasonable charges only will be made sufficient to defray the expense of the trip.

Finally a word of warning to all: First, we want you to do this to properly protect your precious eyes. **OUR MINERALS ARE HARD—Carry SAFETY GLASSES WITH YOU AT ALL TIMES**, and by all means wear them. At some of the mines you may not be permitted to collect or even go on the tours if you do not have safety glasses. Bring good hardy and sturdy shoes to wear that will give you ample protection from turning your ankles or from falling rocks. Gloves will also be a recommended item as many of the rocks will be sharp and cuts will thus be avoided. And first aid kits as well as a buzz bomb and fly dope will be advisable, as the mosquitoes will be big and numerous at times. Last but not least do not go into out of bounds areas, it is imperative that you remain with your party at all times. Your safety will be our primary concern, even to the exclusion of collecting fine specimens. Help us eliminate accidents and avoid confusion. When you are assigned to a certain field trip group your releases will go with that field trip supervisor and he alone will direct you to the piles to be visited. We expect to show you a good time while you are up here and don't forget to bring lots of trading material as from the advance information that I have, just about everybody from every part of the Midwest is planning on doing just that. Evenings will be set aside largely for huge swap sessions.

See you in Ishpeming at Convention time, and watch **EARTH SCIENCE** for more information.

(Continued from page 9)

FIRELANDS GEOLOGICAL CLUB was host to the Eastern Region meeting of the Midwest Federation on Nov. 14. Sixty-three representatives from societies in Michigan and Ohio discussed Rockramas, program ideas, joint field trips, incorporation values, club auctions, public relations, and the importance of having junior groups. The meeting was presided over by the Midwest Federation's Eastern Regional Vice-president, Floyd Mortenson. At the conclusion of the meeting refreshments were served by the Firelands Club and small groups gathered for further discussion.

TRI-COUNTY ROCKS AND MINERALS SOCIETY on Nov. 5 heard an interesting program on the Geology of Michigan's Salt Formation by Gerald Irvine who is a member of the Michigan Mineralogical Society's Community Relations Committee. A series of slides on the salt mining operations under Detroit were also shown.

ELKHART MINERAL SOCIETY at the beginning of the year is initiating a point system for stimulating member participation in club activities. Each member is given a point every time he or she is present at a meeting, field trip, or other official activity of the club. At the end of the year the member with the most points will be awarded a year's free membership in the society.

Cap Townsend won the golden trophy at the society's annual display in November. This award will become the personal possession of any member who wins it three times.

MESABI ROCK AND MINERAL CLUB was just six months old in November, but already has made two successful public displays. In August it featured minerals, gems, and a working lapidary display at the St. Louis County Fair (Minnesota). During the three days of the fair it wore out one diamond saw and started on another. From Oct. 15 to Nov. 15 the society exhibited at the Hibbing Public Library at the request of the library.

GRAND RAPIDS MINERAL SOCIETY at its November meeting heard a good talk on "Modern Methods of Mineral Analysis," by Dr. William C. Kelly, Assistant Professor of Geology at the University of Michigan. During the summer Dr. Kelly engaged in exploratory research of oxidized ore deposits to determine methods of discovering important metal sources by their weathered surfaces. Field work on this project has taken him to Mexico, Alaska and Michigan's Upper Peninsula.

EARTH SCIENCE CLUB OF NORTHERN ILLINOIS, in keeping with the spirit of the Christmas season, gathered on Dec. 11 to hear Reverend Francis G. Guither speak on "God's Surprises." Reverend Guither blended together his profession, the ministry and his hobby, paleontology, when he addressed the group.

In November the society celebrated its tenth anniversary. In the ten years the society grew from 13 members to nearly 500.

WISCONSIN GEOLOGICAL SOCIETY on Nov. 9 heard Dr. Katherine Nelson give an interesting and educational talk on "Fossils." Beginning with the single cell varieties of life that were among the earliest forms of life on earth, of which we have fossil evidence, Dr. Nelson went on to discuss the more complex varieties of the later eras, including sponges, corals and early vertebrates. She amplified her talk with beautiful colored slides of each specimen discussed. Outstanding fossil specimens from Herman Zander's fine collection were on display.

DES MOINES LAPIDARY SOCIETY, by invitation, exhibited at the Governor's Conference on Recreation in Des Moines last September. Members set up two display cases of cutting and polishing rocks and a working demonstration on lapidary. The demonstration and display proved to be the hit of the Conference.

The society joined the Nebraska Mineral and Gem Club on a field trip to Red Oak, Iowa on Nov. 8 to collect protozoa agate from a quarry in the vicinity. The two societies plan to hold another joint field trip this spring.

MEMPHIS ARCHEOLOGICAL AND GEOLOGICAL SOCIETY was given a demonstration on basket-making, as it is being done today and long ago by the Indians, by Mrs. Gipson. Mr. Gipson gave a demonstration on the use of blow guns and brought extra blow guns to the meeting for members to practice shooting at targets with the primitive weapon.

INDEPENDENCE GEM AND MINERAL SOCIETY is making plans for a two-day show to be held in Independence during the early part of 1960. Following the show, the society will hold its annual exhibit at the Kansas City Museum. The annual exhibit features every phase of the rock hobby—from a Loess kindergarten zoo, through crystals, Missouri minerals, which are abundant, polished gemstones, and prehistoric artifacts. The museum finds this exhibit quite a drawing card and in the past as many as 8,000 people have come to view it.

(Continued on page 28)

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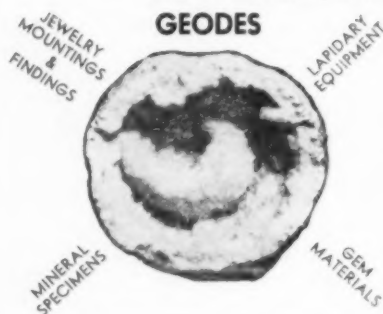
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A Well Water Seismometer

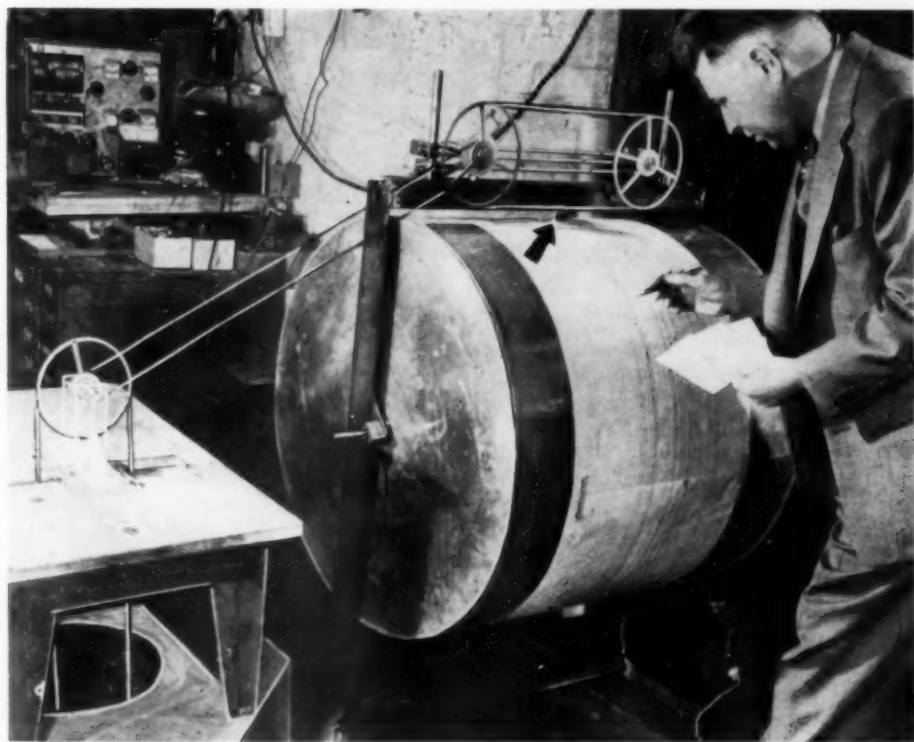
By ELMER E. REXIN

EARTHQUAKE recording instruments of many descriptions are being used at different Universities and Geodetic stations throughout the world. A unique recording device has been designed and built to record fluctuations, caused by earthquakes, in the water level of the well in the basement of the Nunn-Bush Shoe Company, Milwaukee, Wisconsin.

This well was drilled in 1925 to a depth of 400 feet into the Niagara dolomites of the Silurian age. It has a 10-inch casing to a depth of 104 feet and an 8-inch casing from 104 feet to 215 feet. From 215 feet to the 400 foot depth, there is no casing. At present the level of the water is 93.5 feet from the ground level. A log of the well is given in Figure 1.

In 1946 the United States Geological Survey installed a recorder for water table readings in the well. A short time later I noticed vertical lines, very close together, appearing occasionally on the chart. This aroused my interest to the extent of asking Dr. Foley, head geologist of the U.S. Geological Survey for Wisconsin, about the possibility of these being due to earthquakes. Dr. Foley said that it would be interesting to investigate this theory. He secured earthquake confirmation cards from the U.S. Coast and Geodetic Survey and, upon checking, we found that the vertical lines were earthquakes from different parts of the world.

I asked the question, it was answered, but at that time I did not realize that I would become involved in seismology



Author Elmer E. Rexin carefully studies earthquake needle fluctuations recorded on Well Water Seismometer. Note cables descending into well at extreme lower left of photo.

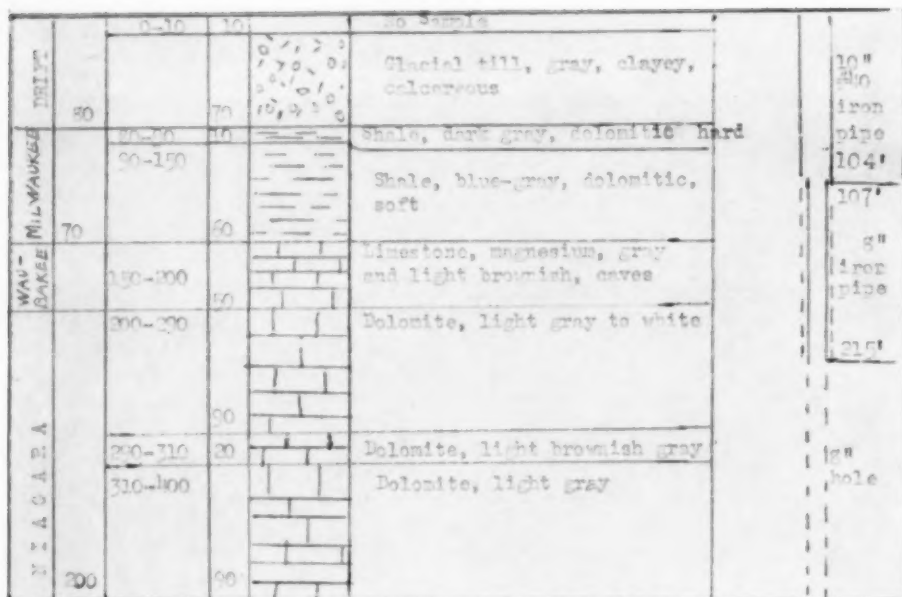


Figure 1. Log of Well at Nunn-Bush Shoe Company.

(the science of earthquakes) even to the extent of designing and building equipment to advance research of this method of recording earthquakes.

An earthquake in the vicinity of Milwaukee on May 7, 1947 caused a water oscillation of 1.3 feet in the well. The following day I was visited by Father Carroll, S.J., head of the physics department and director of the seismograph at Marquette University in Milwaukee. His enthusiasm about the sensitivity of the well to earthquakes aroused my interest to the extent that I decided to build a recorder that would show greater amplification of the water level changes than that shown on the charts of the Leopold-Stevens water level recorder used by the U.S. Geological Survey.

After several models and much experimental development, the present recorder was found to be satisfactory. (See Photo) At the surface of the water, I replaced the L-S float with a light weight float constructed from an aluminum cake pan 6-inches in diameter, sealing off the top with an aluminum disk to prevent water from entering. A fine stainless steel wire (.060 gauge) was attached to the

float and brought over a double sheaved pulley at the ground level and back into the well to a depth of approximately 25 feet at which end a counterweight is attached. Light weight materials were used to keep energy loss at a minimum. When the wire connecting the float and counterweight turns the sheave over which it passes, it drives an endless cord that passes around the other sheave. This endless cord drives the smaller sheave of a step-up pulley which in turn drives another endless cord to which a recording stylus is attached. The pen moves horizontally across a revolving aluminum drum 24 inches wide and 30 inches in diameter. White wrapping paper is used on the drum as chart paper. The drum revolves at the speed of 4 hours and 19 minutes for each cycle, or 1 cm. per minute. This speed was chosen arbitrarily as a good speed to keep the sharp, short period lines of a quake apart. Because the sheaves of the step-up pulley have a ratio of 1-5, the pen records water level changes magnified 5 times.

The new recorder was decidedly successful in that it gave an expanded time scale and magnified vertical scale—thus

bringing out more detail than was apparent in the L-S record in which the preliminary or P waves and the secondary or S waves of a quake were not distinguishable due to the compressed time scale. These waves are important in determining the distance of a quake from the well.

The preliminary wave of an earthquake is analogous to a sound wave and has alternating compressional and dilatational phases. This wave is the faster of the two interior earth types and the only one to pass through the earth's core. Because it travels more directly through the earth, it is the first wave to be recorded. The secondary wave follows much the same route as the preliminary wave except that it is not transmitted through the earth's core. It has larger amplitudes and vibrates normal to its travel path. The surface or crustal waves are by far the most prominent part of each earthquake, and 95% of the earthquake's energy is transmitted as surface waves.

The distance of an earthquake to a

recording station is determined by the difference in time between the very first movement of the P wave and the first movement of the S wave. Here I was in trouble because I could not use the time calculations used for conventional methods of recording quakes. Therefore, I had to find a common denominator of miles per minute, and by the trial and error method found that the distance of a quake to the well averaged 650 miles for every minute elapsed between the P and S waves.

If a circle, whose radius is the distance of the quake from the recorder, is drawn around the station, the quake can be located anywhere on its circumference. When three or more stations have determined their distances and reported them, a triangulation is scribed off on a globe, where the circles intercept is the determination of the epicenter of that individual quake.

If a good record has been obtained on a conventional seismograph, it is possible to some extent to determine the direction

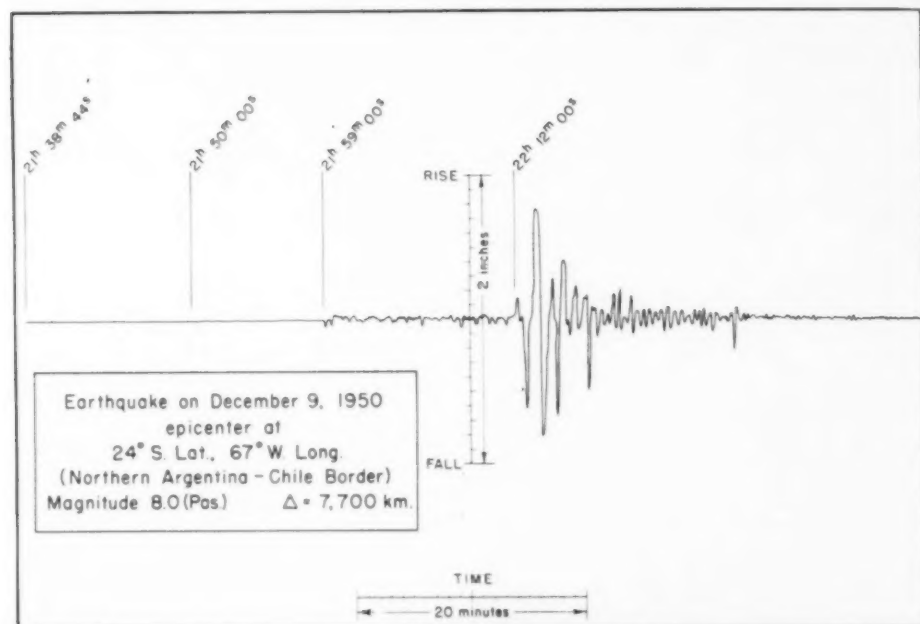


Figure 2. Earthquake water-level fluctuations in Nunn-Bush Shoe Co.'s well, Milwaukee, Wisc., December 9, 1950. The P wave, an almost imperceptible waver, begins at 21 h 50 m., the S wave comes in at 21 h 59 m., and the L or surface waves start at 22 h 12 m. Record furnished by Elmer E. Rexin.

of a quake by a study of the formation of the wave patterns. At present, however, the Nunn-Bush well water seismograph does not lend itself to such interpretation.

The largest quake recorded by the well-recorder at the Nunn-Bush Shoe Company during its 12 years of operation caused the water to oscillate 11.9 feet. This was the Assam-Tibet quake which occurred Aug. 15, 1950, 12,000 miles from Milwaukee (Figure 2). This quake was one of the five greatest quakes ever recorded by seismologists. It took a toll of approximately 5000 lives and left 5,000,000 homeless.

The Assam-Tibet quake started at 8:35 in the morning and its reverberations continued until 9:00 in the evening. The recent quake in Montana on August 18, 1959, caused a water oscillation of 2.5 feet in the well. Its reverberations lasted for 2½ hours. The epicenter of this quake was in Yellowstone Park, Wyoming.

On the government's L-S Chart there were other markings which could not be deciphered readily because of the small

movements. The pattern of these markings was clearly outlined on the magnified recording and by comparative studies, it was determined that these were due to the tides on Lake Michigan, tidal waves, seiches, barometric pressure, and winds on the lake of 20 miles an hour up. The barometric pressure record shows an amplification of 14-1 of the standard micro-barometric recorder. All tides, tidal waves, seiches, and barometric pressure changes reacted on the well in the opposite direction to the lake movement; like a great "U" tube—one end of the "U" being Lake Michigan and the other end the well (Figure 3).

A probable explanation of the sensitivity of the well to earthquakes is that the well connects with a fault from the 400 foot depth downward. This fault may have been formed ages ago when the Porcupine Mountains of Northern Michigan were active volcanoes. The fault may also be filled with water, and as quakes occur, the action would be that of a

(Continued on page 29)

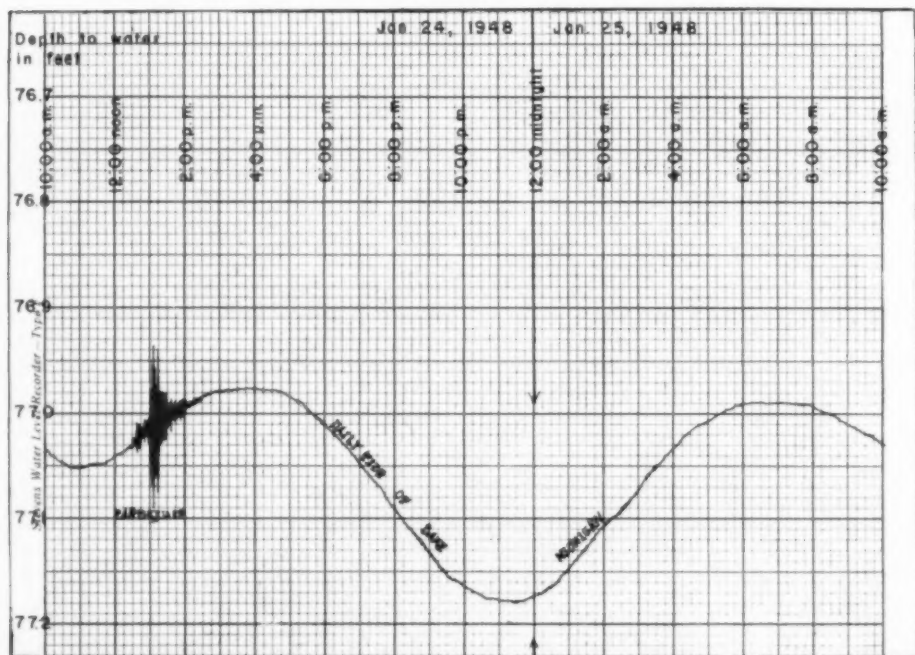


Figure 3. Sterns Water Level record showing daily tide fluctuations on Lake Michigan, in contrast to Earthquake Waves occurring at noon on January 24, 1948.

Indiana's Geodes Are Mysterious

by WILLIAM H. ALLAWAY

OR ARE they? In so far as their origin is concerned there is indeed much divergent opinion. In the first place, what is a geode, and what is a vug, and how do they differ from a concretion?

What is probably the first printed definition of a geode, appears in Phillip's "Mineralogy," published in 1828, which reads, "A geode is a hollow ball, at Oberstein, in Saxony, are found hollow balls of agate (chalcedony) lined with crystals of quartz, or amethyst, which are termed geodes." By common acceptance today, geodes are nodular in shape, while vugs, also hollow openings in the rock, are more apt to be lenticular.

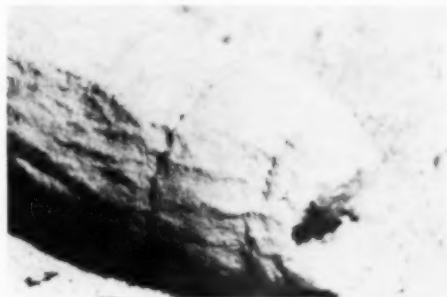
Vugs, which also are often filled with crystals, are definitely a part of the matrix rock and cannot be broken out of or removed, while geodes more often, it seems, are not an integral part of the strata, and are more like something which has been injected or introduced into it in the process of formation. Geodes differ from concretions in that they are formed inward from the outer shell, while concretions develop outward from a center. Even if geodes have been completely filled by mineral matter, their inward projecting crystals prove that they were formed within the cavity.

While vugs are definitely known to be caused by gas pockets or by shrinking of

the matrix or carrying rock, there is now no general agreement as to how the geode opening originated. Perhaps there may have been a number of causative agencies, and at this point our ideas may differ markedly. In the world famous geode beds of the "Keokuk" area of Iowa, Illinois and Missouri, most geodes are well rounded, often potato shaped, but some do not even remotely resemble this shape, being irregular, flat or even pancake shaped, resembling nothing at all in particular.

On the other hand this is not true of the geodes of Indiana, to which it is our purpose here to call your attention. While these beds, located in the vicinity of Bloomington and other neighboring areas, are not so well known, they are nevertheless interesting, if not important, as here the geode nodules take on patterns and shapes which do seem to be more definite. Patterns of what,—is the question, and this as yet has never been fully agreed upon, although it is perfectly obvious to all who have seen them, that they are actually something, rather than the figment of our vain imaginings.

Many of the shapes may be very intriguing, assuming or resembling gigantic crinoid heads, brachiopods, corals and other odd shapes too numerous to mention. Some may even be as large as a good sized pumpkin.



Perhaps a crinoid head!



Could this be a crinoid?

Photos Courtesy of Jerry Latshaw.

Indeed, several paleontological authorities insist that they really are of fossil origin, while on the other hand there are those who are equally as determined that they are just ordinary geodes (nodular), and that whatever resemblance their shape may bear to these early forms of life is purely incidental,—or perhaps accidental would be a better way to state it. The pictures accompanying our article, show the facts of the case much better than we can state them.

Geodes, and the study of their formation are indeed a most interesting digression for the rockhound, and while the origin of their cavities may be more or less mysterious, the method by which this filling took place is more commonly accepted knowledge. Ground waters percolating down through the rock strata from above picked up silica and other minerals less common, carrying them in solution into the cavities already present in the rock where they were permanently deposited, layer upon layer throughout long geological ages. While the quartz minerals form in excess of 90 percent of these fillings, there are more than 40 other known minerals which occur in the geodes of the Keokuk area. Some are even filled with petroleum or sometimes heavier bituminous liquid, but here again just how it got there, nobody knows for certain. The writer would welcome other additional information or ideas which any of our readers might have on the subject, especially upon new locations where geodes have recently been discovered, as we

should like to note such information in the pages of Earth Science magazine.

Editor's Note: For a more complete discussion of geodes and their formation consult: Van-Tuyl, "Stratigraphy of the Mississippian Formation of Iowa." Vol. 30. Reports of the Iowa Geological Survey. Quartz Family Minerals, Chapter XI, Dake, Fleener and Wilson. McGraw-Hill, Publishers. Earth Science Magazine, March 1954, Pg. 28; *ibid*, March 1955, Pg. 12.

LETTERS ARE INTERESTING

Lake Mills, Iowa

Gentlemen:

Please accept my apology for being late in sending in my renewal for your wonderful magazine. If possible, begin my renewal with the November issue so that I will not miss any of the valuable information in it. Thank you.

Most Sincerely,

Simon Winden.

Pittsburgh, Penna.

Gentlemen:—

Don't let anybody tell you that Club News Notes are not interesting. I always read every one of them, as it is nice to know what the other fellow is doing, and frequently we pick up some interesting and valuable information, by so doing. Keep them coming.

Sincerely,

Wm. Dawson.

Coats Street, Mount Morgan,
Queensland, Australia.

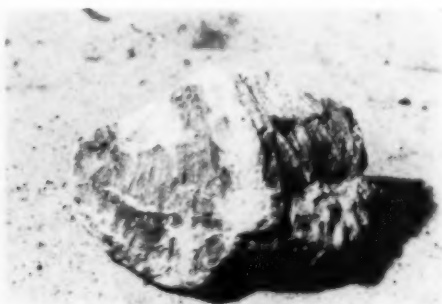
(Quote)— I love to collect data on Railroads of other countries—also on mining. I am a mine worker in a large gold and copper mine in Queensland, Australia. I wonder if any of your readers would care to write to me.

Yours truly,

Bill Brooks.



Whose mailed fist is this?



How about a brachiopod?

Specimens owned by Harry Witmer.

Etching Polished Mineral Surfaces

By WM. H. deNEUI

THE purpose of this article is to describe a simple method for etching the polished surface of agate, marble, glass, etc. by sandblasting suitably stenciled surfaces with powdered corborundum grits. Possibly some of you have already been doing this but I have never heard or seen the subject discussed, so do believe it may be a welcome new interest for many of you.

The equipment I assembled and use for this purpose is of the simplest, and I will describe it only briefly as I know it is capable of infinite variation and improvement, all depending on each individual's ingenuity, mechanical ability and resources. The mechanical end (as opposed to the artistic) achieves only one objective—that is, to propel the carborundum grits against the polished surface with enough force to scar the surface.

Equipment

Figure 1 illustrates the blasting nozzle; the compressed air passes through it,

picks up the grits as they flow from the inverted container, speeds them up through the tapered nozzle, and throws them against the subject. A section of copper or gas pipe will do— $\frac{3}{8}$ " to $\frac{1}{2}$ " diameter. My nozzle is the tip section of an oil can spout, the remainder of the oil can being the grits container.

Figure 2 is a sturdy carton about 15" in each dimension. Provide a muslin top, weighted all around. This lets out the air but catches the grits. Install a glass window for watching the work, a piece of inner tube through which the nozzle is inserted, and an inside light. Carefully seal all joints in the box with masking tape to avoid loss of grits.

The subject may be taped to a block of wood or stone and stands on the floor of the box while being blasted.

Source of Air

I use an old diaphragm type compressor—designed to operate an ordinary paint spray. A $\frac{1}{4}$ -H.P. motor runs it, and

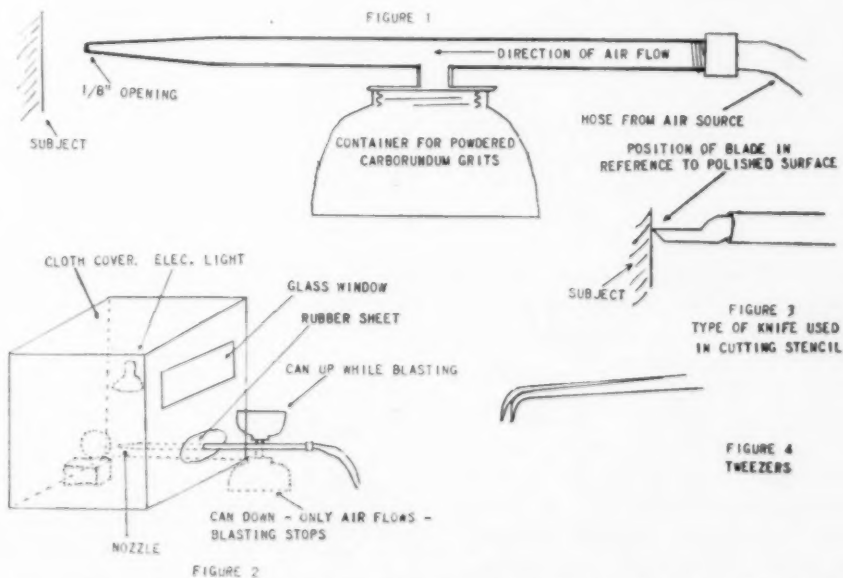


Diagram of equipment assembled by the author, as described in the text of the article.

it provides plenty of volume and pressure for the job. Any kind of compressor will do. You might even arrange to use a double action tire pump. The actual blasting takes only a few minutes.

Operation

The blasting is the easy part of the job. Mount your prepared subject on the floor of the box, stick the nozzle through the rubber sheet, turn on the air, twist the nozzle so the can is on top and hence in the upside-down position which lets the grits flow into the airstream, and you're on your way.

Inspect the subject frequently. You'll want to see that you get into all corners, that you cut deep enough to destroy the polish, that you aren't cutting too deep, etc. You'll soon learn where to hold the nozzle—I find that mine should be from 1/2" to 2" from the subject, depending on type of pattern and material being worked on.

Use your grits over and over. All I've had in "circulation" is one pound which just fills my oil can. I've used No. 80. Perhaps a finer or coarser grit would produce work more to your liking.

Preparing the Subject

1. Your subject is a piece which you have already polished—be it slab, sphere, cabochon or whatever.

2. Cover the entire surface with masking tape (get it at any paint store). An old chair caster will help you roll it on smooth and tight.

3. Draw on your design in sharp pencil. Cigarette lighter fluid is excellent for the erasures you'll be sure to have to make.

4. Cut the stencil. Remove the tape from the areas to be etched—leave it carefully on the areas to be left polished. You'll find the type of knife shown in Figure 3 excellent for the job. If held as shown, it can turn hairpin corners smoothly, and also will hold its cutting edge longer, since only the very point rides on the stone. Dental tweezers (Fig. 4) are a big help in removing the small

bits of the cut-out pattern. Holding the work under a 3" or 4" reading glass, suitably mounted, is also practically a must.

5. When the stencil is finished, examine it very closely under strong light. *This is the critical moment.* The least little shred or speck of the rubber adhesive left in the wrong place, will repel the grits and leave an imperfection on the finished job.

6. Now blast the subject as outlined above and finally, when that is done—

7. Remove the stencil from the subject and behold!—your completed work of art in all its glory!

Material and Type of Design

And now a word about material and type of designs.

Actually my own experience is still so woefully limited I hesitate to advise, but nevertheless this much I have learned, and you might as well have the benefit of it.

(Continued on page 25)



Etched Globe:—Sphere of black obsidian made by the author, which has been widely exhibited.

"ART LAPIDARY!" An Appraisal and An Example

By GUS BROWN

TO THOSE of us who have been awakened to the beauty of stones within the past few years it is difficult to comprehend the extreme youth of this way of life we call rockhounding. Howard, in his *Handbook for The Amateur Lapidary*, wrote: "The subject of gem cutting is shrouded in mystery. Few have written even in generalities on the subject. The author several years ago conducted a search for such literature. He found absolutely nothing." This was written 25 years ago! Yet, man was using stone, cutting stone, admiring and collecting stone before he could write.

Suddenly there has developed actually many thousands of amateur semi-precious gem stone cutters in this country—more than the sum total of all amateur and professional lapidaries in the past 1000 years. Today it is a major hobby, exceeded possibly by only amateur photography.

Cabachon cutting, and its lineage, is the phase of greatest popularity now. Such things as carving, silversmithing, mosaics, faceting and miniature sculpture appeal to a small few. Tumbling has now passed its peak of interest as might be expected.

We are disinclined to follow the ancient jewelry trade into precious metals and expensive stones, and it is doubtful if such an interest will develop. We are still quite absorbed in discovering new slabbing materials—cutting cabachons and free forms and using them for display and for adornment. Most of us are still quite satisfied with simple jewelry mountings which esthetically and essentially serve as a frame or border to augment or emphasize the beauty of the cut stones. And there is certainly nothing wrong with letting an outstanding gem stone be the whole or major attraction. However, if we are to go beyond this point and most surely we shall, then we must find new tools or a new point of view.

Perhaps we should think of using our stones as part of something of greater scope. Design in space using stones instead of a design for stones. When we have learned to do this successfully we will have additional means of expressing ourselves. Our lapidary skills and tools will serve in more permanent and profound scope. Then may we hold forth with the *ART* of the lapidary, and perhaps call ourselves rockhound artists as well as rockhounds.

The photographs of lapidary subjects used on the front covers of some of our national magazines are worthy of careful study and on rare occasions there are short articles of esthetic approach. Perhaps it will not be too long before the editors start giving us articles on the principles of design and frank criticisms of lapidary objects, and perhaps soon we shall begin to see at our shows and conventions more signs of maturity.

We are proud to observe that Earth Science magazine is with this issue to start showing a way. Our inventions of the V-Lock, and the Halo-Transparencies have made primary contributions and our experiments in center pieces, mobiles, constructions, wall plaques, florals and original jewelry designs, are at least part of an avant garde. Study groups in design and art appreciation could help us move forward faster, and we feel that many of our Societies will welcome the opportunity to cooperate and become a part of this great advance in lapidary art, or should we say "art lapidary".

—LAPIDARY for TOMORROW—

THE lapidary phase of our hobby continues to grow very rapidly in the number of enthusiastic members and in the quantity, variety and quality of stones cut. After working on the first hundred or more stones, many lapidary rockhounds start looking for projects, which might

give him greater satisfaction. Gradually there develops a growing awareness of the need for better or higher esthetic comprehension.

Signs of this tendency can be seen by watching and listening carefully to some of the more advanced craftsmen—by comparing the rockhound magazines of today with those of 5 or 10 years ago—by comparing and studying the displays at the larger shows and by just plain visiting.

Collectively we have pretty well mastered the craftsmanship (not the art) of cutting and polishing a cabachon. Our equipment today is simple, inexpensive and sufficiently practical. The several methods of cutting and polishing we use are fast and easy enough for our temperament and for our times.

When we start thinking in terms of using our finished stones and slabs or of using our equipment and rough rocks for more advanced work the fun and the quest really begins for designs and for projects to better satisfy our yearnings.

Where shall we turn for sources of projects? How can we create good original designs? How can we know when a design is good?

It seems quite logical and basic to turn toward fields of professional interest in



Figure 1. "The earrings of Queenstone (Idaho) and attached appendages of sterling, have a certain favorable simplicity. But, the artist has allowed the simplicity to slip away by the use of conspicuous and obvious functional commercial ear screws. It points up the need for more esthetically designed findings."

creative design. The artists, painters and sculptors, the Art Museums and Art Libraries with their books and magazines and with their desire to help and assist would be the proper approach to the solution of this question. We need to learn more of the principles and mechanics of design, so that we may be able to use these basic fundamentals more effectively and correctly in our avocation.



Figure 2. Represents an end piece of banded Mexican agate, and a curved gold filled 18 gauge wire—V-Locked. "The design is quite unique, but lacks quality because the solution is too obvious. The amount of stone cutting is limited. It is not an integrated sound creative design for its use as a piece of jewelry."

Editorial Comment: "After struggling for several hours to improve the design of this piece I have reached the conclusion that the *obvious* is the best possible solution." D.H.

Perhaps many of us feel that we do not have the time, inclination or ability to become artists. Even if this is true—the little time we have devoted to art can help us make some improvements in our work, and can increase the thrill and excitement of our creativity, as well.

Recently I had a grand visit with Robert Edmiston, sculptor, Director of Education for the Des Moines Art Center. He is a very busy man with a heavy work schedule. However, he graciously took time to talk with me and examine some of my

lapidary work. It was all V-Lock jewelry and objects. The V-Lock technic was first published in *Earth Science* in September, 1956, and augmented by a second article in the June 1958 issue. He was very frank, honest and critical. And it was a wonderful experience. "This is a new and unique method of locking stones and metals together. It can give rise to many new varieties of possibilities for the lapidary. Especially for those who are looking for opportunities to develop more creative and beautiful pieces.



Figure 3. A 10 inch centerpiece of medium gauge copper and polished slab of Wyoming tube agate. "This represents two problems merely joined at one point. In the copper there is a rather organic flowing form. To it has been joined a mineral element. There is a lack of integration and it is not a successful piece."

Editorial comment: "I would say that the stone also has "organic flowing form" but neither enhances the other. The intricately cut base needs weight and simplicity, and the long double curve on the left is not a graceful shape, while the one on the right is a graceful curve but leads the eye away from the point of interest. I believe I would start with an agate of better, simpler lines and develop the idea from there." D.H.

"While the work I have seen, so far, represents a start I do not feel that the possibilities for its perfect or complete use have yet been found," Robert Edmiston, sculptor—Curator of Art Education at Des Moines Art Center. These photographs here shown of some of the items he examined, and his comments are worthy of our careful study.

Photographs by Dr. John Uchiyama; Editorial comment by Art Lapidary editor, Donnafred Hoff.

ETCHING MINERALS

(Continued from page 22)

Use material showing the greatest contrast between the etched and the polished surfaces. Dark material, with as little natural pattern as possible. (For extreme examples, black obsidian) is excellent—pale grey striped agate is very poor. Or perhaps you'll be able to utilize the natural color pattern of the stone by somehow building your design into it, and to accentuate it.

As to designs; letters, numerals, monograms, etc., present this problem—the slightest imperfections of outline are readily noticeable and because of the fineness of the design, extremely hard to avoid. On the contrary conventional floral designs, wreaths, lodge symbols, maps (see *Globe* illustrated), etc., do not present this problem. It might even be possible to make cameo type etchings of profiles—for example of Franklin or Washington as shown on 1894 and earlier stamps, or of your wife or daughter from a snapshot of suitable size; the stencil to be made by careful cut-out glued to the subject stone.

You'll find that the mechanical problems are simple, and that the required equipment is well within the reach of most of our purses. The matter of design and execution, however, is a challenge to our very best abilities, and nicely done work makes a fine and worthwhile addition to our collection—as I said before, a brightly gleaming added facet to our Gem Hobby.

Rescuing Ancient Petroglyphs

by C. H. SCAMMON

SINCE THE DAWN of history, man has attempted to immortalize himself in various ways. Ancient Egyptians built pyramids; Solomon and others erected temples; and the Romans constructed large arenas and lasting roads, while later great cathedrals were built at many places throughout Europe, all enduring evidences of man's desire to hand down to the future something from the past.

In our own hemisphere similar and perhaps equally great efforts were put forth by ancient civilized races living in South and Central America, Mexico and in our own Southwestern States.

While the Egyptians inscribed their history and events in hieroglyphs (from the Greek, meaning sacred and carved), our own early peoples, especially in Mexico and Central America, used similar inscriptions to record their activities, and too, our far roaming nomads in other parts of the country, who were perhaps the early ancestors of our more recent Indian tribes, made use of much simpler symbolism known to archeologists as petroglyphs, or picture writings on stone.

As you will observe from the pictures shown, these writings were just that and little more, being often so simple that any tribe, and even the Eskimos from the far north, could decipher the inscriptions of the Aztecs almost as well as those of their near neighbors. It was from these and other forms of inscriptions that our alphabets were built, and through long centuries of evolution the art of writing and printing has evolved.

This is why it is so important that as many of these petroglyphs as possible be preserved and made available for future study while they are yet obtainable, and why such great effort is being made to save them at the present time.

According to H. Thomas Cain, Head of the Department of Archeology, Uni-

versity of Arizona, in his book "Petroglyphs in Central Washington" published by the University Press, University of Washington, there are 40 principal sites where petroglyphs and pictographs occur on the Columbia River and its tributaries from the Canadian border to the mouth of the Snake River.

At one site in particular, listed as site 33m—Vantage I, there are more than 300 separate figures. When it became known that most of these petroglyphs were to be inundated by the rising waters of the Wanapun Dam now under construction, never to be again seen by anyone living on the earth today, the



Photo taken at Site 29, Vantage II, showing Petroglyphs in situ, located about a mile upstream from the writer's home.



Petroglyphs being arranged permanently in as natural setting as possible near the Ginkgo Museum shown at the upper left of the picture.

Washington State Parks and Recreation Commission decided that as many as could be rescued should be moved down to the Ginkgo Museum located on higher ground. Here they could be seen and studied by visitors to the Park as long as it continued to exist.

The choice of this location was suggested by Mrs. Arlie G. Ostling, a student at the University of Washington, and the placards describing them are to be her work. Mr. Bob Attwell working with my

assistance and lift truck removed about 50 petroglyphs from Site 33, and a few others from Site 32—Vantage II. The site of our present home will also be inundated by the flood waters of the dam, and we will have to relocate ourselves elsewhere on higher terrain. Wherever we move, however, we intend to display our large collection of petrified logs and Indian artifacts, and as in the past visitors will always be very welcome.



Tom Sanger, Park Superintendent, shown examining many of the Petroglyphs recovered, stored temporarily for the winter near the Ginkgo Petrified Forest Museum.

(Continued from page 13)

CHICAGO ROCKS AND MINERALS SOCIETY made a two-day trip to Wausau, Wis. during October. The group collected quartz crystals from Rib Mountain and picked up moonstone from the roadside in unbelievable quantities. Over 50 members made the 600-mile trip.

Dr. Eugene Richardson, Curator of Invertebrate Paleontology at the Chicago Museum of Natural History, spoke on "Invertebrate Paleontology" at the society's November meeting.

MINNESOTA MINERAL CLUB viewed a 25 minute sound film on "Crystals" at its November meeting. The meeting also featured a special contest in which prizes were awarded in the following categories: 1. The best mineral specimen found by a member in 1959. 2. The best fossil found in 1959. 3. And the best piece of lapidary work finished in 1959. Just before each meeting of MMC, William Bingham, gemologist, gives free lessons in gem identification and lapidary work to interested members.

FLINT ROCK AND GEM CLUB held an open house meeting in November. Highlight of the evening was a talk entitled "Rockhounds Paradise—The Upper Peninsula of Michigan," by the Midwest Federation's popular president, Charles R. Markert. Members from ten other Michigan societies attended the meeting.

MADISON GEOLOGICAL SOCIETY on Nov. 16 heard Thomas F. Laudon, a member of the University of Wisconsin's Geology Department, speak on "The World Gravity Program." In connection with this IGY program, Mr. Laudon visited 23 countries during the International Geophysical Year. His talk was well illustrated with slides.

CENTRAL IOWA MINERAL SOCIETY on Nov. 6 heard an interesting talk by Professor Busch of Drake University, on the "Megascopic Description of Rocks." A short film on "The Earth's Rocky Crust" was shown.

MICHIGAN MINERALOGICAL SOCIETY has completed a color slide program with sound tape and written commentary dealing with the geology of Michigan and its influence on the scenery and industry of the state. This colored slide program, entitled "Michigan—Jewel of Many Facets," is available to the society's members for presentation to outside groups. The society planned to celebrate its twenty-fifth anniversary on January 11. George Switzer, Curator of Mineralogy at the Smithsonian Institution, was scheduled to be its guest speaker.

MICHIGAN GEM AND MINERAL SOCIETY reports that it found a large number of geodes and fossils in Brown County State Park last fall while on a field trip to southern Indiana. The fossils, including crinoid heads, were composed of quartz rather than the usual limestone fossils found in the society's own vicinity.

ROCHESTER EARTH SCIENCE SOCIETY heard an interesting talk by Mr. and Mrs. Harold Whiting at its October meeting. The Whitings discussed their trip to Death Valley for boron specimens and showed colored slides of the entire area.

On Nov. 9 Dr. Eiler Hendricksen of Carleton College presented the society with an illustrated lecture on his mineral explorations by helicopter last summer with a group of geologists in Alaska.

Members of RESS are aiding the Rochester State Hospital with its occupational therapy program by giving patients weekly lessons on how to cut, polish and tumble stones. A new lapidary shop was installed in the hospital last fall.

CENTRAL ILLINOIS ROCKHOUNDS is initiating the Midwest Federation's new area participation show program with a Rockrama to be held Sept. 23-25, in the Masonic Temple in Decatur, Illinois. The Temple has a well lighted, 65 by 85 ft. exhibition room. There is ample space for private, state and dealer displays. A large parking lot adjoins the building and there is ample additional parking space on the streets. All clubs in Illinois and neighboring states are invited to help make this show a great success.

KALAMAZOO GEOLOGICAL AND MINERAL SOCIETY at its November meeting accompanied Dr. Ron Smith down the Batchawana River in Canada by canoe, via colored slides taken on the trip. Dr. Smith made several stops along the way to pan for gold. Mr. and Mrs. Otto Neumann showed colored slides of their vacation in Minnesota and Northern Michigan.

ST. LOUIS GEM AND MINERAL SOCIETY featured a gem and mineral display at the recent hobby show in St. Louis. The tenor of the public's remarks on the exhibit was one of high praise, and, as usual, there were many amusing comments. One lady looked at a beautiful group of calcite crystals, a real museum piece, and said, "Now who in the world would want that!" A man asked the inevitable question "Do you people smoke the thinking man's cigarette?"

(Continued from page 18)
 syringe bulb and thin tube. Of course, this is all theory for I have not been able to get down that eight-inch hole and, having been born in St. Louis, Missouri, I would like to say "You've got to show me." Probably some day a way can be found to confirm this theory.

NOTES ON THE YELLOWSTONE QUAKE*

THAT the great Earthquake of August 18th, 1959, near West Yellowstone, Montana, caused momentary changes in water levels in wells throughout the country, has been reported by the United States Geological Survey.

"These changes were registered by automatic water-stage recorders which are operated by the Geological Survey for hydrologic studies. Effects were registered in States as far away as Hawaii. Preliminary reports from Idaho, New Jersey, Florida, and Hawaii show that water levels jumped at least 17 inches at some places, while at others the effect was only about a quarter of an inch. Large fluctuations occurred in States near the epicenter of the quake. At some places the effect was so strong that recorders "jumped the track," so the full amount of water-level change cannot be determined.

"Among the distant points of observation, a well in Union County, N.J., had the largest fluctuation—17 inches in all. In four other New Jersey wells the fluctuation was only about an inch. These wells are about 1,900 miles from the epicenter of the earthquake.

"The earthquake was registered in Hawaiian wells, about 3,200 miles from the epicenter, at about 9 p.m. August 17 (local time). Preliminary reports from the Geological Survey's Honolulu office show that in three wells on the island of Oahu the water levels rose and fell about a quarter to three-quarters of an inch.

"The Florida office reports that in wells around Miami water-level changes ranged from 1.7 to 5.8 inches. These wells are about 2,100 miles from the earthquake epicenter.

"Not only earthquake waves, but passing trains as well, affect water levels in aquifers. In fact, the effect is so marked that one can determine train schedules by observing the ground-water charts at given wells. The loading of the earth's crust by ocean tides is recorded in many coastal wells. Even the tidal effect of the moon on the rock strata themselves is recorded in a few wells hundreds of miles from the coast."

*Now officially known as the "Hebgen Lake Earthquake."

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OTHER SOCIETIES

MISSISSIPPI GEM AND MINERAL SOCIETY will sponsor the first gem, mineral and fossil show ever held in Mississippi on Feb. 20-21. It will be housed in a spacious modern building at the State Fairgrounds in Jackson, Mississippi. Not only large displays of competitive exhibits are planned, but many smaller exhibits. It is intended that anyone having a genuine interest in the materials that come from the crust of the earth shall have an opportunity to exhibit here with separations into categories at comparable levels and divisions. The society anticipates exhibits from many parts of the country in addition to local exhibits. All rockhounds and dealers are welcome. For further details contact Mr. W. B. Johnson, P.O. Box 9921, Jackson 6, Mississippi.

COLORADO MINERAL SOCIETY started the first of a series of courses in earth science subjects in January. Ten two-hour lectures will be devoted to the first subject, "Elementary Geology," which is being taught by Charles O. Parker. The courses are restricted to members of CMS.

COMPTON GEM AND MINERAL SOCIETY visited Black Canyon in the San Bernardino County on Nov. 7 to collect cherry opal, orange opal, green opal and jasper-agate. Indian petroglyphs were sighted in the canyon.

EL PASO MINERAL AND GEM SOCIETY visited the Southwest Research Branch of the New York Museum of Natural History in Arizona on the week end of Oct. 17-18. The research station, which is located at an elevation of 5,000 feet, studies and collects specimens of the flora and fauna of the Southwestern Desert. The society also made a trip to nearby Crystal Cave and collected many fine clusters of quartz crystals from Crystal Mine which is an open diggings where crystals have been removed from the ground.

OKLAHOMA MINERAL AND GEM SOCIETY reports that novaculite has been found to be a very satisfactory abrasive for tumbled-polishing quartz minerals, garnets, and other gem materials up to a hardness of 8. Arkansas novaculite has been used for years in the manufacture of the world's finest razor hones. Although very fine grained, it has the peculiar property of always presenting a sharp abrasive surface. Prior to the advent of modern artificial abrasives, Arkansas novaculite was shipped to Germany for use in grinding optical lens, and was even used to put the final edge on diamond tools. Arkansas is famous for its novaculite, but Oklahoma has plenty of it rimming the Potato Hills and Kiamichi mountains.



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MIAMI MINERAL AND GEM SOCIETY won the Wise trophy for the third time at the Eastern Federation's 1959 Convention which was held in Boston. This trophy is awarded to the club with the largest percentage of its members participating in the Convention's show. One hundred percent of MM&GS members had displays at the Convention. It would be interesting to know how many clubs in the American Federation have matched this record at any convention.

GEM CUTTERS GUILD viewed films of member Harvey Schrecker's hazardous boat trip down the Colorado River at its November meeting. Mr. Schrecker displayed stones that he had collected in the area where the Colorado River and the Green River merged. He also showed a number of fossils which he had obtained by trading Maryland's well known Rose River unakite.

MINERALOGY SOCIETY OF PENNSYLVANIA visited the Limestone Products Company's quarry at Limecrest, N.J. on Oct. 18. Specimens of green and black spinel, aragonite, gray-blue sapphire and claystone concretions were found. In the afternoon the group gathered in the lower level of the quarry to hear Ronald Scudder, geologist for the State of New Jersey, talk on "Geology of the Limecrest Area." He outlined the four geologic divisions of New Jersey and explained the formation of the Limecrest Quarry.

RECOMMENDED READINGS

"Random Notes on the Art of Display," by Harry Sprague, October issue of the *Tri-County Newsletter*. Novice collectors who are thinking about arranging their growing collections will find Mr. Sprague's article a great help.

* * * *

"Indian Artifacts," November issue of *Pick and Dop Stick*. An informative three-page review of "America Before Columbus," an interesting lecture presented to the Chicago Rocks and Minerals Society by Addison Avery at its October meeting.

* * * *

"Midwest Finds," October issue of *Treasure Chest*; "Why the Midwest Is Best," November issue of *Template*; and "Favorites from the Midwest," November issue of *Trilobite*. Three excellent articles by June Zeitner on collecting minerals in the Midwest. All Midwesterners will take new pride in their area after reading Mrs. Zeitner's informative articles.

BOOK REVIEWS

(Continued from page 8)

The new edition is longer by 79 pages than the preceding. Chapters are devoted to crystallography; physical, chemical, descriptive and determinative mineralogy; and to occurrence and uses of minerals. The major revision throughout appears to be the broad use of the crystal-chemical approach. This serves as a basic and unifying force relating the properties of minerals through fundamental structural and chemical considerations. The chapter on crystallography has been expanded to include a discussion of stereographic projection, the thirty-two crystal classes, the calculation of axial ratios, and X-ray crystallography. The author assumes that his readers are familiar with the basic essentials of chemical reactions and nomenclature.

Excellent photographs of crystal models were provided by Professor B. M. Shaub of Smith College.

PHYSICS AND GEOLOGY. J. A. Jacobs, R. D. Russell, Professor and Associate Professor, University of British Columbia, and J. Tuzo Wilson, Professor of Geophysics, University of Toronto, and President of the International Union of Geodesy and Geophysics, 1959. 424 pp. \$9.75. McGraw-Hill Book Company, Inc.

This book describes the nature, composition, and behavior of the earth from the viewpoints of geophysics, geology, and geochemistry. The subject matter is unusually broad in scope and provided the material for college courses at the University of Toronto on the physics of the earth. According to the authors, the book has two primary aims: (1) To give students of geology an introduction to the physics of the earth, and (2) To give scientists in other fields some knowledge of geology and its relation to geophysics. Besides fulfilling these aims, the authors likewise present us with a volume which is interesting fare for the general reader with scientific taste and, by and large, not too technical for his grasp.

In the past geology has chiefly concerned itself with those parts of the earth's surface which are exposed above the sea, and tracing the earth's history as indexed by fossils. Methods developed and applied during recent years, however, have made it possible to describe the whole earth, from its deep interior to its outer atmosphere. Some of the more tempting chapter headings include Geochronology, Seismology and the Interior of the Earth, the Ocean Floors, Thermal History of the Earth, and Glaciology.

The diagrams and illustrations are an integral part of the book. The authors have been

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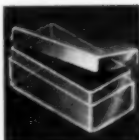
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THERE'S ADVENTURE IN GEOLOGY. **THERE'S ADVENTURE IN MARINE SCIENCE.** Julian May. Popular Mechanics Press, Chicago, 1959. Each \$2.95.

These two books in Popular Mechanics' Career Series, are good reading for teenagers and precocious pre-teens who absorb their science best in admixture with fiction and adventure.

Through the eyes of the hero, Randy Morrow, the young reader of **THERE'S ADVENTURE IN GEOLOGY** sees the layers of prehistoric rock along the walls of the Grand Canyon as Randy journeys down Bright Angel Trail to the bottom of the Canyon. A geologist accompanying the party explains to Randy (and the reader) the sequence of the various layers and names them. A paleontologist points out fossils and Randy's brother helps extricate a Stegosaurus. Similarly instructive journeys are made to Michigan's Keweenaw Peninsula and to Meteor Crater.

In **THERE'S ADVENTURE IN MARINE SCIENCE** we find Randy in a succession of adventures in the Bahamas. Now an expert skin diver, Randy learns first-hand about underwater coral beds and strange creatures that inhabit the deep. New friends are made who join him in an attempt to reconnoiter a sunken ship. There's a real villain who shoots at Randy with a spear gun. It would not be fair to tell how our hero foils his would-be murderer, but it was his knowledge of marine science that did the trick!

ADVENTURES WITH FOSSILS. Robert H. Shaver, Geological Survey, Indiana Dept. of Conservation, Bloomington, Indiana, 1959. 49 pp. \$0.35.

Dr. Shaver has written a booklet about fossils primarily for children and those that guide the activities of children. It is not a detailed text or reference, but presents a sweeping picture of Indiana fossils with an imagery that has you packing your pick and knap sack. You observe the life in ancient seas and forests, scramble up Indiana's cliffs and down its quarries, and consider individual fossils from Foraminifera to mastodon teeth.

Of interest to adults are the exact directions to fossil collecting spots in Indiana and the graphic homey descriptions of what to do when you get there. C.F.S.

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The Diamond Smugglers (Fleming)	2.50
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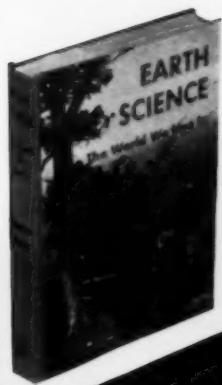
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